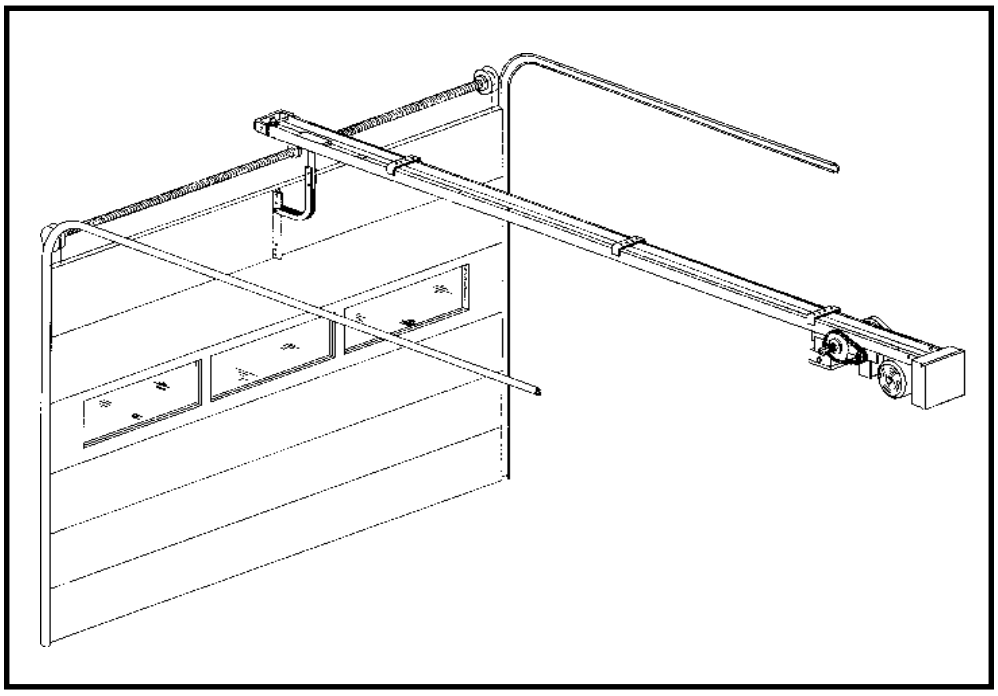
Model H/HB

Heavy-Duty Industrial
Drawbar Door Operator
Safety, Installation and
Service Manual



OSCO requires use of an electric edge or photoelectric control for pedestrian protection on all automatic or remotely controlled gate operators.

OSCO®

OPERATOR SPECIALTY CO., INC.
P.O. BOX 128, CASNOVIA, MI 49318

032498
12-1-97

Safety Information and Warnings

Read all of the following before beginning to install the Model H or HB operator:

1. Read the green “SAFETY INSTRUCTIONS” sheet provided with the operator information. It’s extremely important that the safety warnings and precautions be understood and followed by the installing contractor. Leave all instructions with the end user.

2. Do not attempt to operate the machine unless it is completely installed as instructed.

3. The installation must be made in a neat and professional manner, observing all rules of good workmanship and personal safety.

4. All electrical connections to the power supply must be made by a qualified and licensed electrician. All local and national codes must be observed.

5. A power-disconnect switch should be located within sight of the operator so that primary power can be turned off when necessary.

6. Do not remove the operator cover unless you are qualified to service this equipment and the power is turned off. There are no user-serviceable parts inside.

7. Install enclosed warning signs so as to be visible to all persons passing near or through the door.

8. Operate the door only when it is in full view.

9. Do not permit children to play on or around the door.

10. Never reach through or around a door frame to operate the door controls.

11. Install all recommended safety equipment.

Features

Mechanical

- Continuous-duty industrial motor
- Adjustable friction clutch
- Dependable roller chain drive
- Efficient dual V-belt reduction
- Emergency disconnect for manual operation
- Magnetic disc brake optional
- 3” Headroom required above high rise of door

Electrical

- Easily adjustable rotary limit switches
- Quick-disconnect door arm
- Contactor-type magnetic reversing starter
- Available in all voltages
- 24V control circuit
- Three-button control — Open–Close–Stop
- Adaptable for pull cord, radio control, reversing door edge, photoelectrics, keyswitches, time-delay systems, or loop detectors

CAUTION

OSCO STRONGLY RECOMMENDS USE OF AN ELECTRIC EDGE OR PHOTOELECTRIC CONTROL FOR PEDESTRIAN PROTECTION ON ALL AUTOMATIC OR REMOTELY CONTROLLED DOOR OPERATORS.

Children should never be allowed to play on, near, or around a motorized door. Any control devices should be placed so as to be inaccessible to small children.

The door should never be operated unless it is in visual sight of the user.

Warning signs must be installed on or near the door.

A pushbutton or keyswitch should not be installed within reach of the door or operator.

LIMITED ONE-YEAR WARRANTY

This electric operator is warranted for a period of one (1) full year from date of installation against defects in materials or workmanship. Any part, parts, or complete unit which fails because of such defects within this period shall, at the manufacturer’s option, be repaired or replaced at no charge. The manufacturers will not be responsible for transportation and/or field service charges.

This warranty is in lieu of all other warranties, expressed or implied, and shall be considered void if visible evidence implies recommended installation procedures and maintenance instructions were not followed.

Installation Instructions

Step 1: Operator Assembly

Secure the rails to the power unit using the 5/16” bolts provided. Then slide the traveller onto the rails, making sure that the chain connection is away from the power unit and toward the front.

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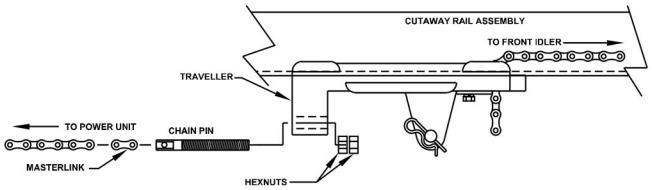
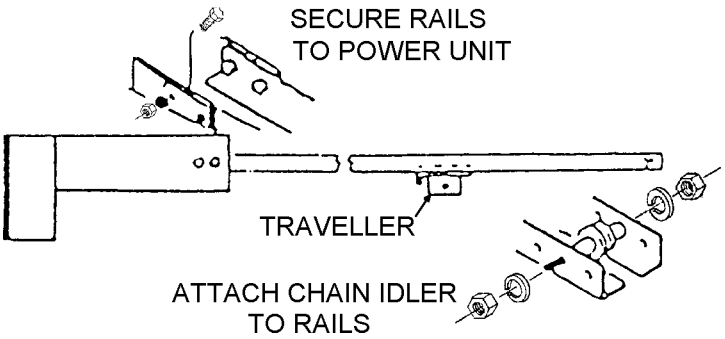


Attach the front idler assembly and shaft to the rails, using the appropriate holes (as shown) and tighten securely.



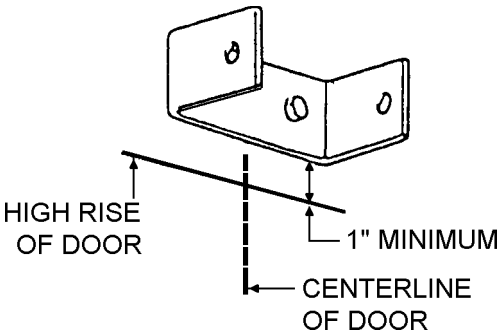
Unroll the chain in the direction of the chain idler, allowing the chain to loop around the pulley. Continue unrolling the chain and engage the sprocket at the power unit. Chain should be pulled tight before engaging the sprocket, but do not overtighten, as damage can result. Be sure the chain is strung though the hole from the top.

Locate the traveller near the center and attach the chain. Tighten the chain sufficiently to remove any slack but, once again, do not overtighten, as damage can result.

Using the 5/16” hardware provided, attach the center rail supports to the rails.

Step 2: Header Bracket Positioning

Locate the centerline of the door opening and draw a light pencil line on the door header and on the upper portion of the door. Then, by raising the door, determine the “high rise” of the door. This is the highest point to which the door will rise when the top section starts to go over the radius of the track. Using lag bolts provided, mount the front header bracket a minimum of one inch above the high rise on the centerline of the opening.



Step 3: Operator Installation

Using two 5/16” bolts, attach the operator to the header bracket.

Raise the power-unit end of the operator and open the door fully. Support the operator 3–4 inches above the door, using a ladder or other suitable substitute. Make sure the operator is in line with the door centerline.

(Installation Instructions Cont’d on Page 4)

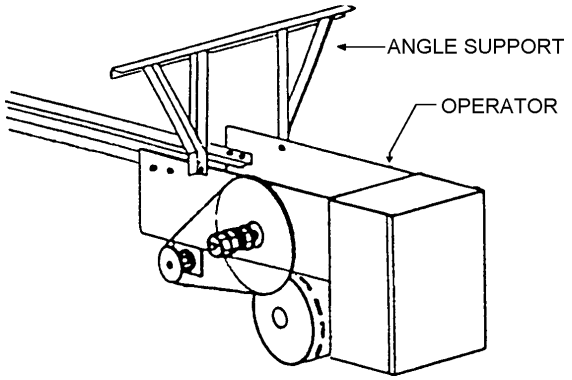
Installation Instructions (Cont'd)

Step 3: Operator Installation (Cont'd)

Secure the operator to the ceiling or overhead truss, ensuring stability and allowing the operator to rest above the path of the door track.

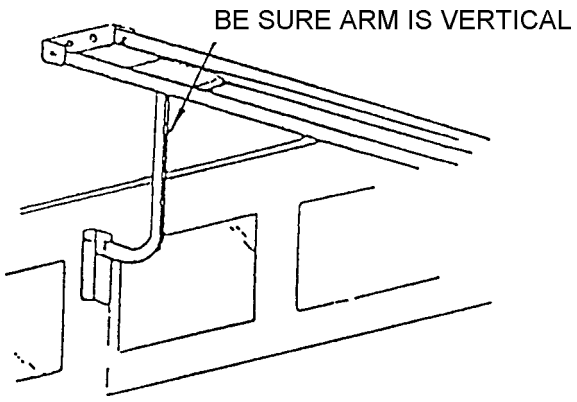
Important: During door travel, the operator must be a minumum of one inch above the door and be properly aligned.

Normally, angle iron of 1" X 1" X 1/8" size is ample for hanging the operator, provided sufficient rigidity can be obtained by diagonal bracing.



On doors over 10 feet high, it is necessary to support the center (approximately) of the rail with a hanger dropped from the ceiling. Holes are provided in the rail for this purpose.

Finally, manually close the door fully and secure the door bracket on the door centerline directly in line with the door rollers. For wood doors, use two carriage bolts. For metal or fiberglass doors, use two 5/16" bolts.



Step 4: Electrical Connection

A complete electrical circuit print is included with the operator information packet. The power supply must be of correct voltage and phase and should be brought into the operator with no smaller than No. 12 wire. For proper wire gauge, refer to **"Wiring Specifications,"** on Page 12. Electrical power must be ample and not taken from an overloaded line, as faulty operation will result. Proper thermal protection is supplied with the operator. The motor contains a thermal overload protector to guard against overheating due to overload conditions.

IMPORTANT

A. Power supply must be of correct voltage and phase.
B. Always disconnect power from the operator before servicing.
C. Keep clear of the door during operation.

IMPORTANT NOTICE

This operator is supplied with a 3-button control station (OPEN–CLOSE–STOP) accompanied by a precautionary sign:

WARNING
TO PREVENT ENTRAPMENT DO NOT START DOOR DOWNWARD UNLESS DOORWAY IS CLEARED

It is vital that the 3-button station be mounted within sight but out of reach of the door and that the warning sign be mounted adjacent to the 3-button station.

The 3-button station must be connected so the STOP circuit between terminals #2 & #4 is not bypassed. Also, if additional 3-button stations are to be connected, the STOP buttons must be wired in series.

NOTE: A STOP button must be used when the installation has radio controls or a single button.

Desired Function	Connecting Terminals
OPENING DEVICE	#1 & #4
STOP	#2 & #4
CLOSE	#3 & #4
OPEN & CLOSE	#4 & #5
SAFETY TO REVERSE	#1 & #6
24VAC POWER	#2 & #10

Limit Switch Adjustment

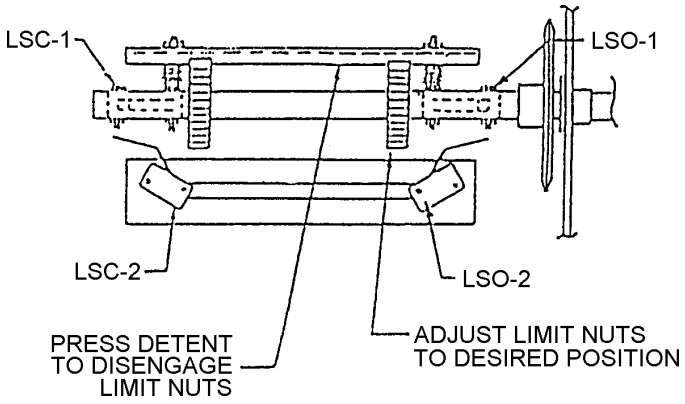
Limit switches are factory set for short travel. Travellers should be at least two feet from either end of the rails when the unit is assembled.

1. Disconnect the door from the traveller.

2. Turn the power on and push the OPEN or CLOSE button. The traveller should move approximately two feet.

TURN OFF POWER TO THE OPERATOR BEFORE MAKING ADJUSTMENTS!

3. Adjust the limit nuts (found in the electrical control panel) by releasing the spring-loaded detent plate and turning the nuts in the desired direction. One complete turn will allow the traveller (or door) to move approximately four inches.



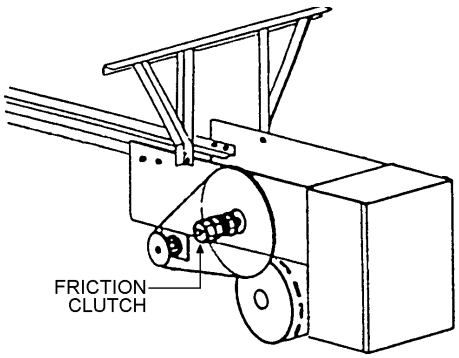
IMPORTANT: LSO-2 and LSC-2 must be actuated before LSO-1 and LSC-1. LSO-2 should be actuated three revolutions of limit shaft before LSO-1.

4. Be sure the detent plate is properly locked into both limit nuts when adjustment is complete.

NOTE: On 3-phase equipment, direction can be wrong. If the door closes when the OPEN button is pressed or vice versa, any two of three motor leads must be reversed. **DO NOT REVERSE THE PUSHBUTTON LEADS**.

Clutch and Cutoff Switch Adjustment

The clutch is set light at the factory and must be properly adjusted in the field for the size and weight of the door. Adjust the clutch spring tension so the operator will drive the door closed. It is best to start with a light adjustment and tighten one-half turn at a time.



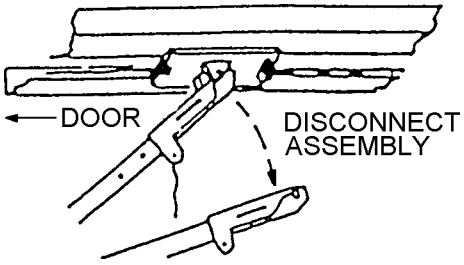
Lubrication

The operator bearings and motor are factory lubricated for life. It may be advisable to oil the roller chain to prevent excessive dryness or rusting under humid conditions.

Manual Disconnect

For your safety and protection, this operator is provided with a manual disconnect system. It is recommended that all persons be well informed of its purpose and operation.

To disconnect the operator, pull the disconnect cord as shown. To re-engage the operator, pull the disconnect cord down and manually connect the door arm to the traveller.



IMPORTANT!!!

A. POWER SUPPLY MUST BE OF CORRECT VOLTAGE AND PHASE.
B. DISCONNECT POWER FROM OPERATOR BEFORE SERVICING.
C. KEEP CLEAR OF DOOR DURING OPERATION.

Maintenance and Service

Introduction

Except for the instant-reverse relay used on single-phase operators, the Model H is a conventional 3-button operator with the following components:

- a 3-button control station (OPEN-CLOSE-STOP); the door can be stopped and reversed in any position
- rotary-type open and close limit switches
- across-the-line magnetic reversing starter with C-size contactor
- magnetic brake, when required

On single-phase operators, it is important that you understand the instant-reverse relay. The purpose of this relay is to give a standard four- or five-wire O/L-type motor a reverse action. This relay is in series with the start winding of the motor and is, therefore, controlled by the centrifugal switch of the motor. There are two poles on this relay, one being in series with the OPEN button and the other in series with the CLOSE. When the motor is at rest, the centrifugal switch, which means the instant-reverse relay, is energized and its contacts are closed, making the buttons operative. When the motor starts, the centrifugal switch opens at about 1400 RPM, dropping out the instant-reverse relay and making the buttons inoperative while the motor is running. If the opposite button is held, nothing happens until the limit switch is struck. When the motor speed decreases, the centrifugal switch closes, energizing the small relay and putting the starter winding back into the circuit. Because of this action, the motor instantly reverses.

Common Installation Faults and Adjustments

Operator hung too high. The front of the operator should be approximately one inch above the high rise of the door. The rear of the operator should be hung parallel to the track or even sloped downward to remain one to two inches from the door when the door is open. NEVER hang the operator six to eight inches above the door at the rear.

Door arm not in the vertical position when door is closed. This is probably the most common fault in the field. The traveller should be run within three inches of the front sheave. The door arm should be cut with the traveller in this position. When this is properly done, your door will close smoother, your front limit cam will be easy to adjust (no chance for limit switch to center), and your door will be locked.

Front end anchored directly to block or masonry. The front end bracket should be bolted (using carriage bolts) to a 2 X 8 that is, in turn, anchored to the wall. The front end bracket has insufficient area to permit its being anchored directly to masonry.

Improper anchoring devices used in block or masonry. Neither cement nails nor lead anchors are recommended. Lags and shields should be used or, when in the center of a block, toggle bolts can be used. Bolting through the wall is, of course, preferred.

Center braces omitted on commercial operators. Install all center braces supplied with the operator.

Chain left with too much slack. Avoid.

Clutch not adjusted. Factory adjustment is light, as it is intended that the installer will tighten only enough to achieve proper drive and safe operation. Take up 1/2 turn at a time on the jam nut until proper adjustment is obtained. A too-tight adjustment will only transfer the load to the belts and chain. In cases of door interference, this can cause failure of some other operator part and tend to reduce operator safety.

Improper pushbutton wiring, especially where two are involved. See wiring diagrams.

Improper brake adjustment. Avoid.

Troubleshooting

Door will not operate from OPEN or CLOSE pushbutton:

A. The motor overload kicked out. Wait 15 minutes; the overload will automatically reset. Be sure the door is not binding.

B. The fuse or overload in the main box is blown. Replace the fuse or reset the overload.

C. Check for a defective transformer.

D. Check for a defective STOP button or loose connection in the stop circuit.

Door will not open from OPEN button but will close from CLOSE button:

A. Make sure the open limit switch is not hung up.

B. Check for loose wiring on the open limit switch or the open relay coil.

C. Check for a defective open relay coil.

Door will not close from CLOSE but will open:

Same as preceding, but in reverse.

Door runs in wrong direction on 3 phase:

Reverse the two motor leads.

Door not closing properly:

Be sure the detent plate is properly engaging the travelling limit nuts.

Motor runs but door doesn't move:

A. Tighten the clutch.

B. Check the set screw in the motor pulley.

C. Check the V belt.

Operator vibrates and bows:

If the door is 10 feet or higher, be sure center support is used.

Operator stops when you release button (makes rocking noise):

The clutch spring is too loose. Tighten the clutch nuts.

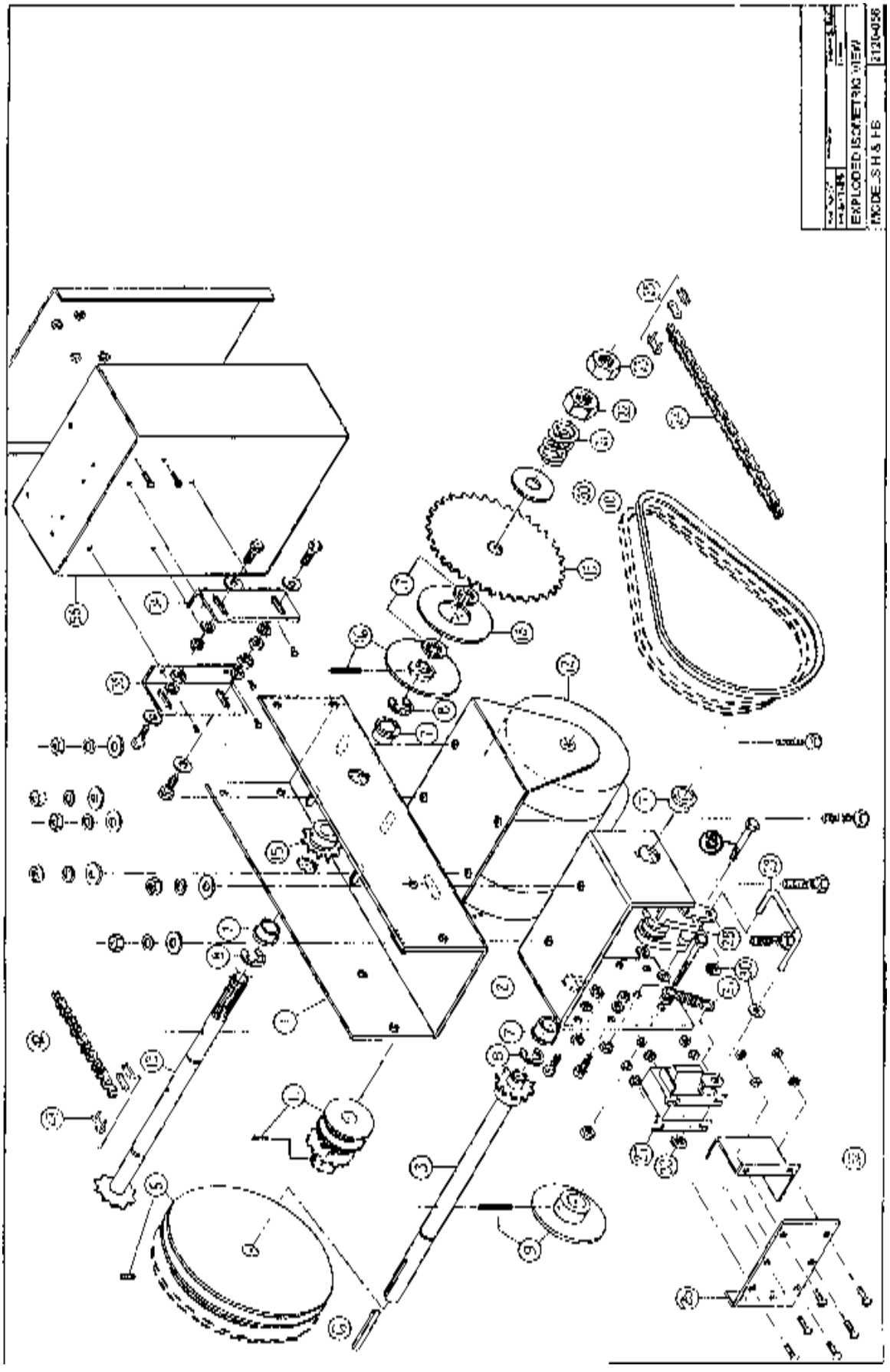
Operator requires constant pressure on OPEN or CLOSE button:

Check that the clutch sprocket is properly seated.

Ordering Replacement Parts

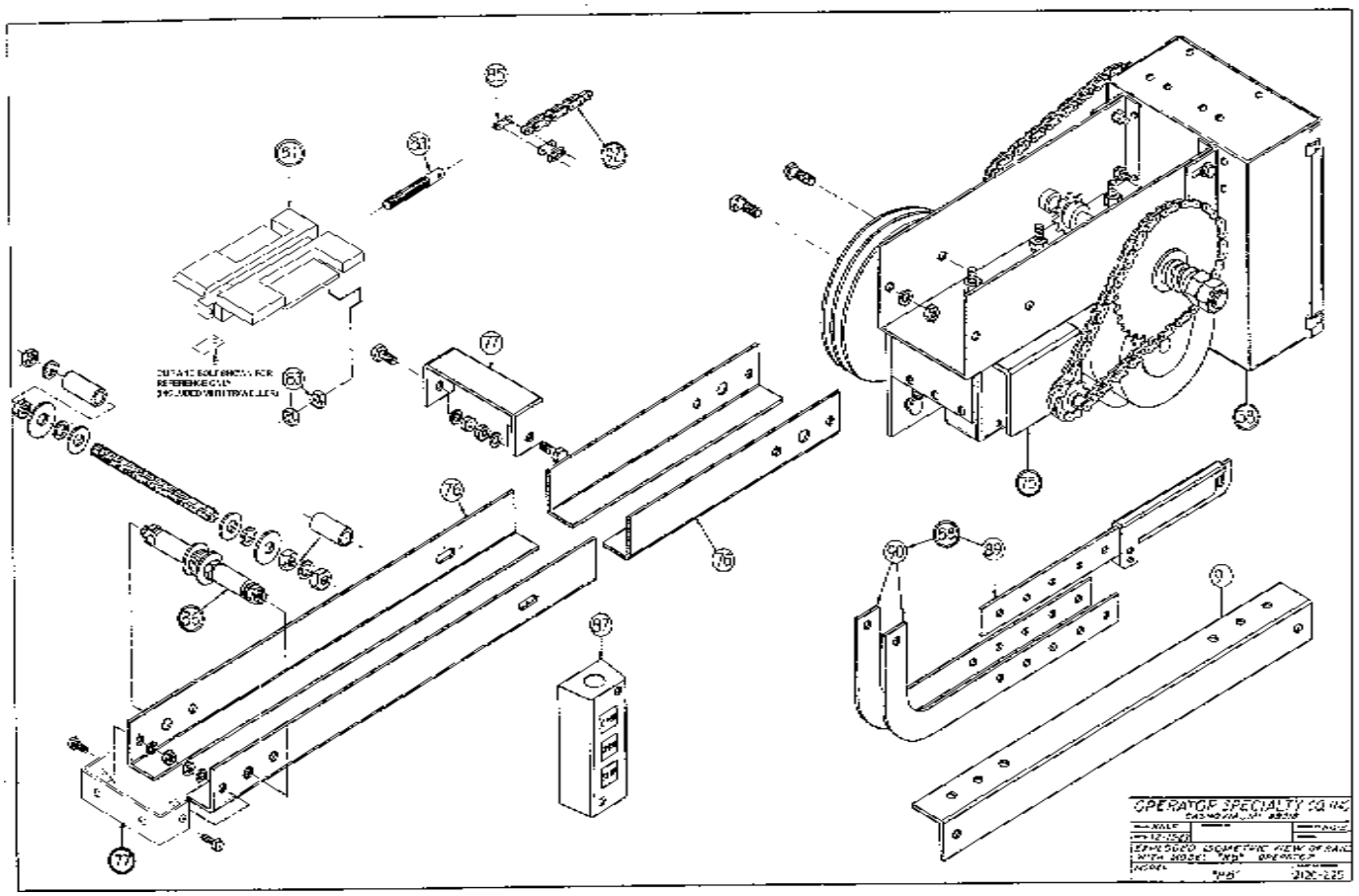
Use the numbers shown in the lists on the following pages to order all replacement parts.

1. Supply the serial number of your operator.
2. Specify the quantity of pieces needed.
3. Order by part number and name of part.
4. State whether to ship by freight, truck, parcel post, UPS, or air express.
5. State whether transportation charges are to be prepaid or collect.
6. Specify name and address of person or company to whom parts are to be shipped.
7. Specify name and address of person or company to whom the invoice is to be sent.



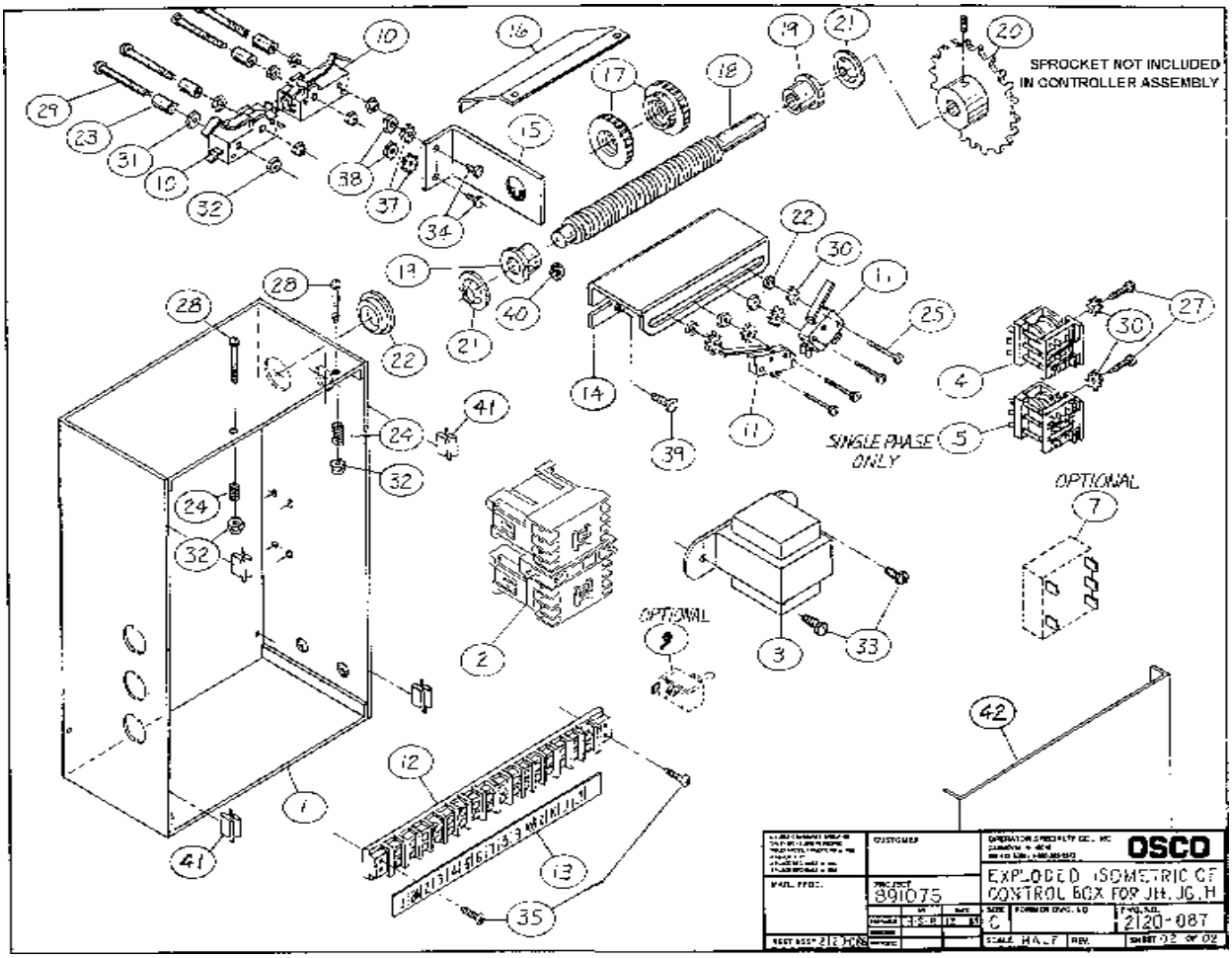
Models H and HB
Parts List #117
OSCO Drawing #2120-058

Ref. No.	Part No.	Description
	2110-602	Intermediate Shaft Assembly - H
	2110-603	Intermediate Shaft Assembly - HB
2	2100-1125	Shaft Bracket - H
	2100-1023	Shaft Bracket - HB
3	2110-729	Shaft and Sprocket Assembly, 41-B-9
5	2200-309	Double Pulley, 7"
7	2200-195	Flange Bearing, 5/8"
8	2400-215	E-Ring, 5/8"
9	2100-546	Disc (HB only)
	2400-088	Roll Pin, 3/16” x 1 3/8” (HB only)
	2110-253	Clutch Shaft Assembly
13	2110-461	Shaft and Sprocket Assembly
15	2200-413	Drive Sprocket, 48 B 10
	2400-206	Spring Pin, 3/16" x 1 1/4"
7	2200-195	Flange Bearing, 5/8"
8	2400-215	E-Ring, 5/8"
16	2100-669	Clutch Hub
	2400-088	Roll Pin, 3/16" x 1 3/8"
17	2400-187	Thrust Washer, 1/8"
	2500-188	Thrust Washer, 1/16”
18	2100-564	Disc Facing
19	2200-294	Sprocket, 41 A 36
20	2400-066	Washer, 5/8”
21	2200-306	Clutch Spring
22	2400-061	Hex Nut, 5/8"
23	2400-062	Jam Nut, 5/8"
24	2200-427	#41 Clutch Chain, 24 Links
42	2200-453	#48 Limit Chain, 19 Links
1	2100-764	Main Frame
34	2100-712	Left Mounting Bracket
35	2100-713	Right Mounting Bracket
58		Complete Controller Assembly
11	2200-207	Motor Pulley Double
10	2200-234	V-Belt, 28" (1/2 HP only)
	2300-124	V-Belt, 29" (3/4 HP and over)
	2100-844	Motor Spacer, (3/4 HP and over)
		Motors
12	2500-2160	1/2 HP, 115/230V, 1 Phase
	2500-2161	3/4 HP, 115/230V, 1 Phase
	2500-2162	1 HP, 115/230V, 1 Phase
	2500-1600	1/2 HP, 208/230/460V, 3 Phase
	2500-1601	3/4 HP, 208/230/460V, 3 Phase
	2500-1602	1 HP, 208/230/460V, 3 Phase
		Brake Assemblies (HB Only)
	2510-038	115V, complete
	2510-122	230V, complete
	2510-312	460V, complete
27	2500-178	Solenoid, 115V
	2500-177	Solenoid, 230V
	2500-1351	Solenoid, 460V
28	2220-040	Brake and Puck Assembly with Brake Lever 2100-960
29	2100-845	Rod
31	2200-243	Spring
32	2100-216	Solenoid Cover
26	2100-900	Mounting Bracket



Models H and HB
Parts List #117
OSCO Drawing #2120-225

Ref. No.	Part No.	Description
77	2100-801	Header/Rail Support Bracket
81	2200-887	Traveler
83	2110-533	Chain Tension Bolt with Hex Nuts
85	2200-010	#48 Master Link
92	2200-654	#48 Chain, per foot
86	2110-266	Front Idler Assembly
88	2110-227	Complete Door Arm Assembly
89	2110-328	Upper Door Arm Assembly
90	2100-937	Lower Door Arm
91	2100-767	Door Bracket
87	2500-033	Standard 3-Button Station
		Rail Pairs 1 1/2" X 2"
76	2100-628	10' 8" Long — for 8' Door
	2100-629	12' 8" Long — for 10' Door
	2100-630	14' 8" Long — for 12' Door
	2100-631	16' 8" Long — for 14' Door
	2100-632	18' 8" Long — for 16' Door
	2100-633	20' 8" Long — for 18' Door
		#48 Drive Chain Assembly
		(chain, master link, chain bolt, nuts)
	2110-486	22' — for 8' Door
	2110-456	26' — for 10' Door
	2110-457	30' — for 12' Door
	2110-458	34' — for 14' Door
	2110-459	38' — for 16' Door
	2110-460	42' — for 18' Door



Models H, HB, JH, and JG
Parts List #147 (Electrical) • OSCO Drawing #2120-087

Ref. No.	Part No.	Description
	2520-231-C	Complete Controller, 115V, 1 Phase (WD #2600-177)
1	2110-675	Controller Enclosure without Cover
2	2500-2084	Contactor, 24VAC, 4-Pole
3	2500-766	Transformer, 115/24VAC, 75VA
4	2500-541	Relay, 24VAC, 3PDT
5	2500-542	Relay, 115VAC, 3PDT
	2500-849	Relay, 24VDC (not shown)
7	2500-1366	Timer (optional)
9	2500-001	Timer Switch (optional)
10	2500-030	Open Limit Switch, SP
11	2500-440	Close Limit Switch, SP
12	2500-071	Terminal Strip, 16-141
13	2300-052	Terminal Strip Label
14	2100-339	Limit Switch Bracket
15	2100-058	Limit Shaft Bracket
16	2100-056	Detent Plate
17	2200-030	Limit Nut
18	2100-057	Limit Shaft
19	2200-029	Flange Bearing, 1/2”
20	2200-008	Limit Sprocket, 48 B 10
21	2400-029	Push Nut
23	2100-060	Spacer
24	2200-028	Detent Spring
41	2400-001	S-Clip
42	2100-1701	Controller Enclosure Cover only
	2500-442	Terminal Strip 3
	2520-232-C	Complete Controller, 208/230V, 1 Ph (WD #2600-178)
3	2500-767	Transformer, 208/230/24VAC, 75VA
5	2500-543	Relay, 115VAC
	2520-233-C	Complete Controller, 208/230V, 3 Ph (WD #2600-144)
3	2500-767	Transformer, 208/230/24VAC, 75VA
	2520-234-C	Complete Controller, 460V, 3 Ph (WD #2600-144)
3	2500-768	Transformer, 460/24VAC, 75VA
	2500-1343	Fuse, 3 amp
	2500-1819	Fuse Holder
	25020-136	Delay Reverse Module

Wiring Specifications

1. Select from the chart at right the section corresponding to the phase, voltage, and horsepower of your operator.

2. The distance shown on the chart is measured in feet from the operator to the power source. **DO NOT EXCEED THE MAXIMUM DISTANCE**.

3. When large-gauge wire is used, a separate junction box (not supplied) may be needed for the operator power connection.

4. Select the gauge for control wiring from the top chart below. If a greater distance is required, our remote station interface is suggested. Call the factory.

5. Wire run calculations are based on the National Electrical Code, Article 430, allowing 5 percent voltage drop.

6. Supply voltage must be within 10 percent of the operator rating under load conditions.

7. Connect power in accordance with local codes.

8. The wire tables are based on standard copper wire. Wire insulation must be suitable to the application.

NOTE: If the power run is over 500 feet, consult your power utility company about possible power drops overhead or underground.

Control Wiring

Volts	Max Distance (ft)	Wire Gauge
24V	250	14
	350	12
Over 350 ft, see interface chart.		

Control Wiring w/ Interface

Volts	Distance Over (ft)	Wire Gauge
24V	350	14

USE COPPER WIRE ONLY

Power Wiring

	Volts & HP	Max Distance (ft) Single Unit	Max Distance (ft) Dual Unit	Wire Gauge	Volts & HP	Max Distance (ft) Single Unit	Max Distance (ft) Dual Unit	Wire Gauge
Single Phase	115V	120	60	12	208V	475	240	12
		190	95	10	230V	760	380	10
		305	150	8		1200	600	8
	1/3HP	485	240	6	1/3HP	1915	960	6
	115V	125	60	12	208V	370	185	12
		200	100	10	230V	585	295	10
		315	160	8		935	465	8
	1/2HP	500	250	6	1/2HP	1485	740	6
	115V	65	30	12	208V	260	130	12
		105	50	10	230V	415	205	10
		165	80	8		665	330	8
	3/4HP	265	130	6	3/4HP	1055	600	6
	115V	55	30	12	208V	225	115	12
		85	45	10	230V	360	180	10
		140	70	8		570	285	8
	1HP	225	115	6	1HP	910	455	6
Three Phase	208V	650	325	12	460V	2850	1425	12
	230V	1035	515	10		4535	2265	10
		1645	825	8		7210	3605	8
	1/3HP	2615	1310	6	1/3HP	11465	5730	6
	208V	620	305	12	460V	2705	1350	12
	230V	985	490	10		4305	2150	10
		1565	780	8		6850	3425	8
	1/2HP	2485	1240	6	1/2HP	10895	5445	6
	208V	440	220	12	460V	1935	965	12
	230V	700	350	10		3075	1540	10
		1115	558	8		4890	2445	8
	3/4HP	1775	885	6	3/4HP	7780	3890	6
	208V	345	170	12	460V	1595	795	12
	230V	545	275	10		2535	1265	10
		870	435	8		4030	2015	8
	1HP	1380	690	6	1HP	6405	3205	6
	208V	235	120	12	460V	1040	520	12
	230V	380	190	10		1655	825	10
	1 1/2	600	300	8	1 1/2	2635	1315	8
	HP	955	480	6	HP	4190	2095	6
	208V	180	90	12	460V	795	400	12
	230V	290	145	10		1265	635	10
		460	230	8		2015	1005	8
	2HP	730	365	6	2HP	3205	1600	6